Evaluating Natural Resource Management Plans: Insights for Longleaf Pine Restoration Planning

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Outline

- SECAS Conservation Decision Guidance Library Project
- Longleaf Pine Plan Evaluation Study
  - Natural resource problems and planning
  - Methods
  - Results
  - Discussion
  - Conclusions and future work
- Going Forward

SECAS Conservation Decision Guidance Library
Project Objectives

(1) Develop a better understanding of the management decision context for important SECAS resource management themes using restoration of open pine ecosystems as a case study

(2) Improve understanding of how management decisions are being made and how the decision making process can be improved

(3) Design a questionnaire to evaluate socio-structural drivers of decision making associated with SECAS

EVALUATING NATURAL RESOURCE MANAGEMENT PLANS: CASE STUDY OF LONGLEAF PINE RESTORATION PLANNING
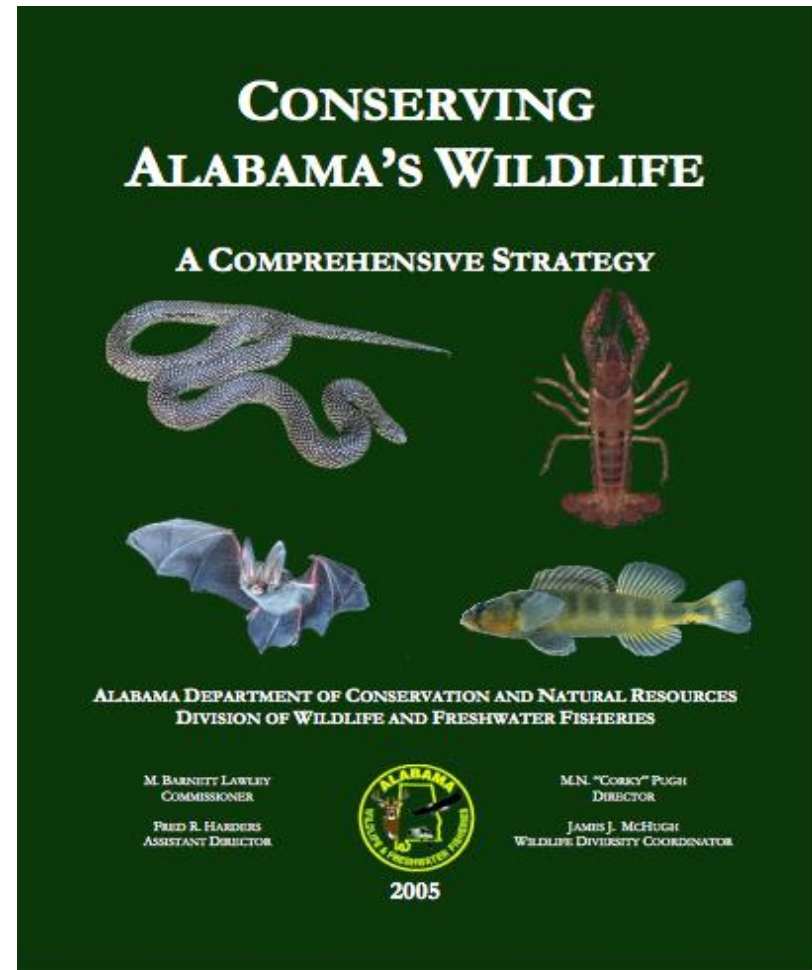
Natural Resource Problems

- Increasingly complex and 'wicked'
  - Difficult to clearly define
  - Only better or worse solutions
  - No clear stopping rule
- Scale mismatches
- Multiple stakeholders
- Limited resources, time, and information

Natural Resource Planning

- Followed the rational-comprehensive model
  - Science-based, expert driven approach
  - Assumes predictable environment and available information
  - Assumes consensus among stakeholders about goals and best alternative
- Traditional model may be inadequate to address complex NR problems
- Expanded to include adaptive management, public involvement, and collaboration

Natural Resource Management Plans

- Used widely
- Shape natural resource use and allocation
- Often required by legal mandates
- Created using considerable amounts of time, money, staff

Plan Evaluation Study

- NR problems are increasingly more complex
- Planning has shifted towards learning from doing and iteratively improving over time.
- Need to assess whether planning is adequately addressing natural resource problems

Research Objective

- Assess planning practice for longleaf pine systems by evaluating and comparing management plans from federal, state, and nongovernmental agencies
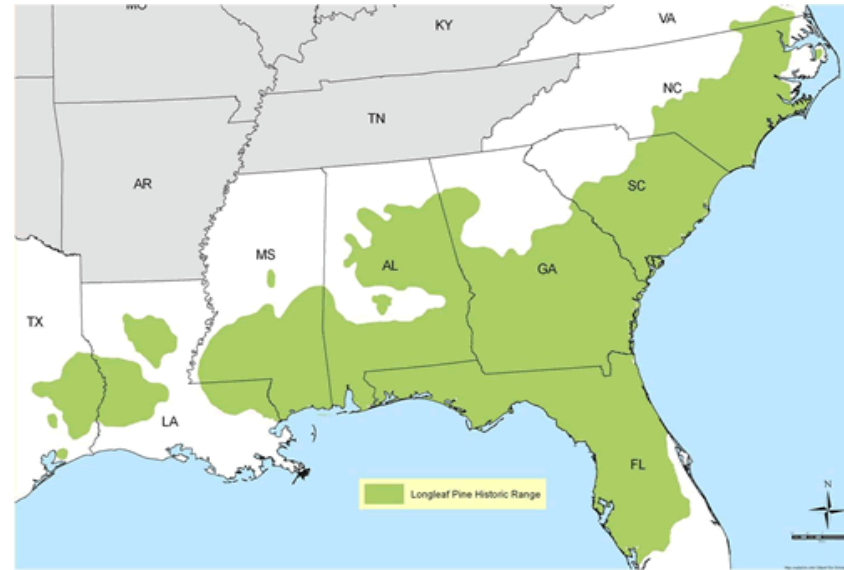
Longleaf Pine Restoration

- Decline due to overharvesting, conversion to loblolly, fire suppression, urbanization

- 3.4 million acres currently
  - Less than 3% of original range
  - 45% public owned
  - Isolated fragments

- Provide habitat for ≈ 30 threatened and endangered species

- More resilient to climate change than other Southern pines
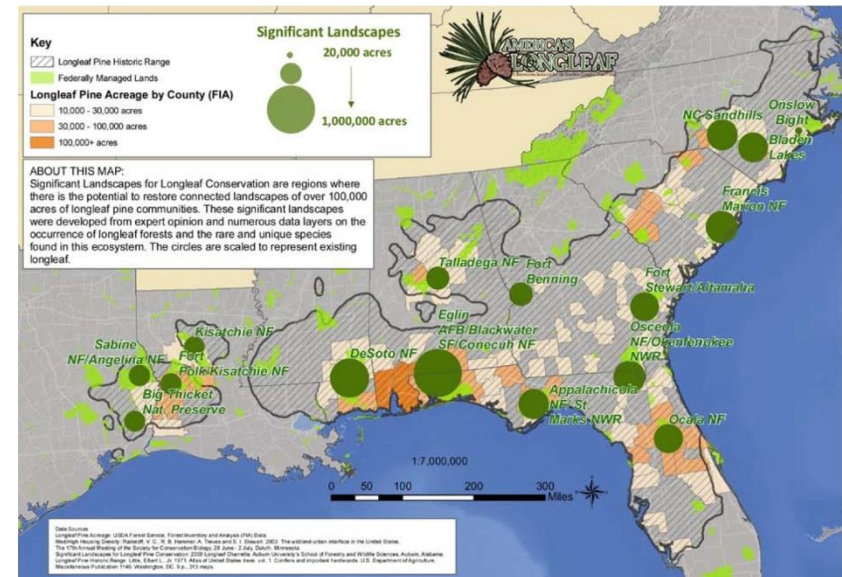
Longleaf Decision Context

- Complex, dynamic system
- Involving multiple stakeholders
  - Federal, state, and NGO decision makers
  - Private landowners
  - Public
- No consensus about restoration objectives and actions
- Limited resources for restoration

Longleaf Pine Historic Range

Data and Methods

Management Plans

- 71 federal, state, and nongovernmental agency plans
  - Provided direction about longleaf pine ecosystems
  - Publically available
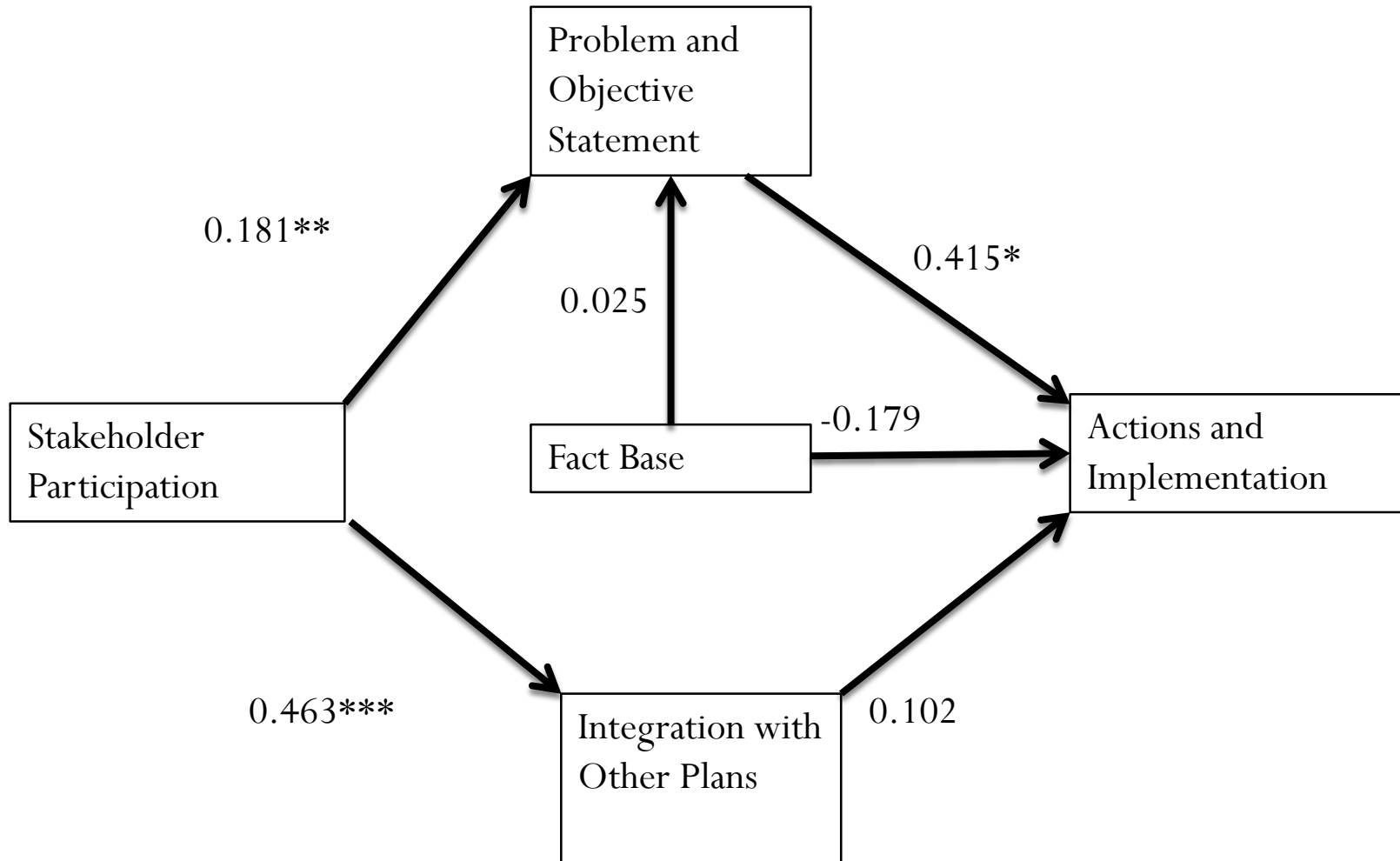- Stratified sample includes 35 plans

Methods

- Designed plan evaluation tool
- Conducted intercoder reliability test
  - Percent agreement: 86%
  - Cohen's kappa: 0.72
- Evaluated 35 plans
  1. Problem and objective statement
  2. Fact base
  3. Actions and implementation
  4. Integration with other plans
  5. Stakeholder participation
- Conducted path analysis, ANOVA tests, and regression analysis

Results

Plan Evaluation Results

Category	Score	Std. Deviation
1. Problem and objective statement	70.2	14.2
2. Fact base	88.4	14.5
3. Actions and implementation	45.1	18.2
4. Integration with other plans	80.0	34.2
5. Stakeholder participation	76.6	36.0
Total	68.9	12.9

Problem and Objective Statement

0.181**

0.025

0.415*

Stakeholder Participation

Fact Base

-0.179

Actions and Implementation

0.463***

Integration with Other Plans

0.102

Model goodness of fit statistics:
SRMR=0.073
Overall R^2=0.386
*p<0.10 **p<0.05 ***p<0.01

ANOVA Results

Evaluation Score (y-axis, 0–100) vs Plan Type (x-axis)

Plan Type	Score	Group
Fish and Wildlife Service	79.4	A
Department of Defense	74.3	A B
State Wildlife Action	69.9	A B
State Forest Action	68.2	B C
Forest Service	61.7	B C D
Joint Venture	55.5	C D
NGO	49.1	D
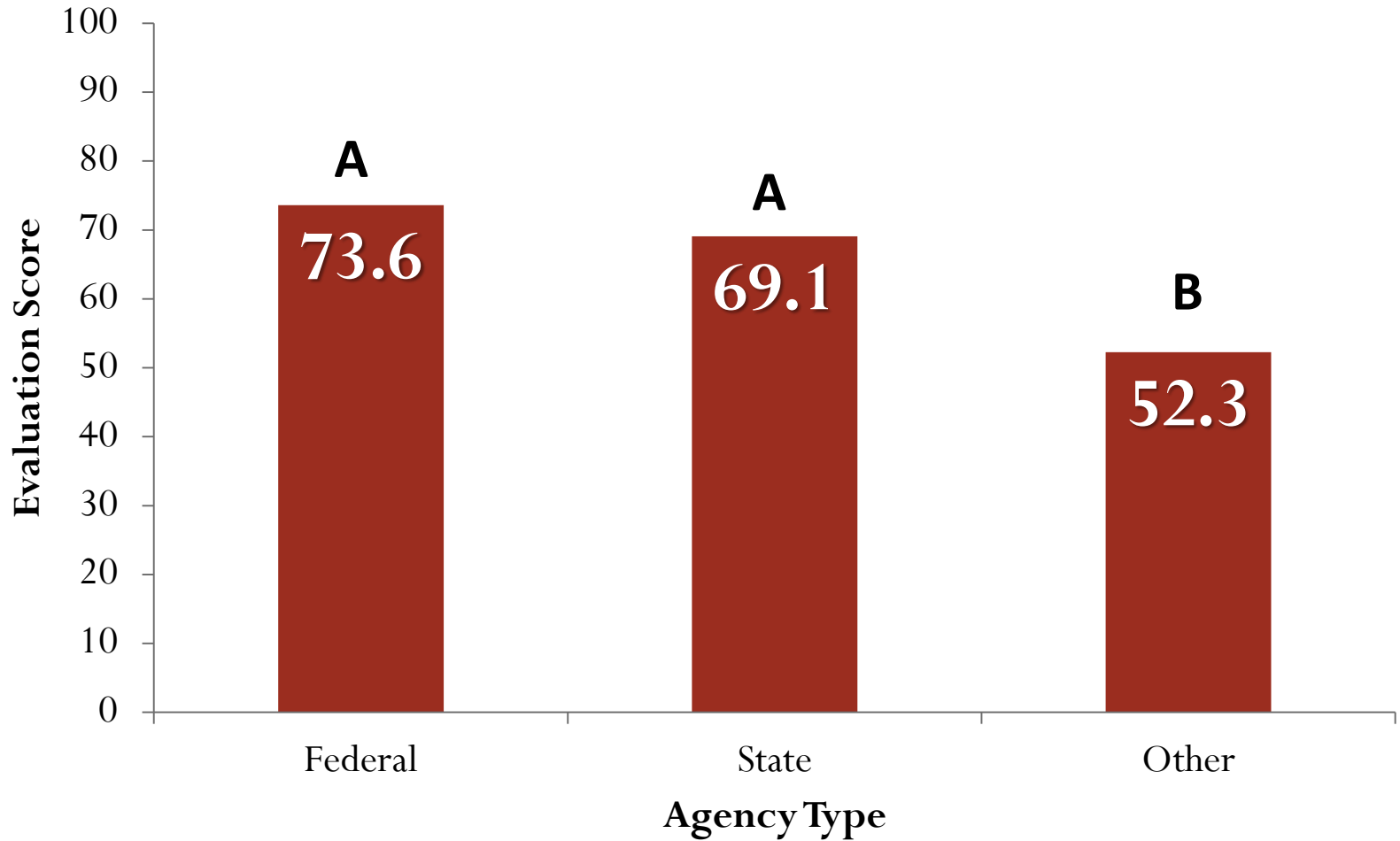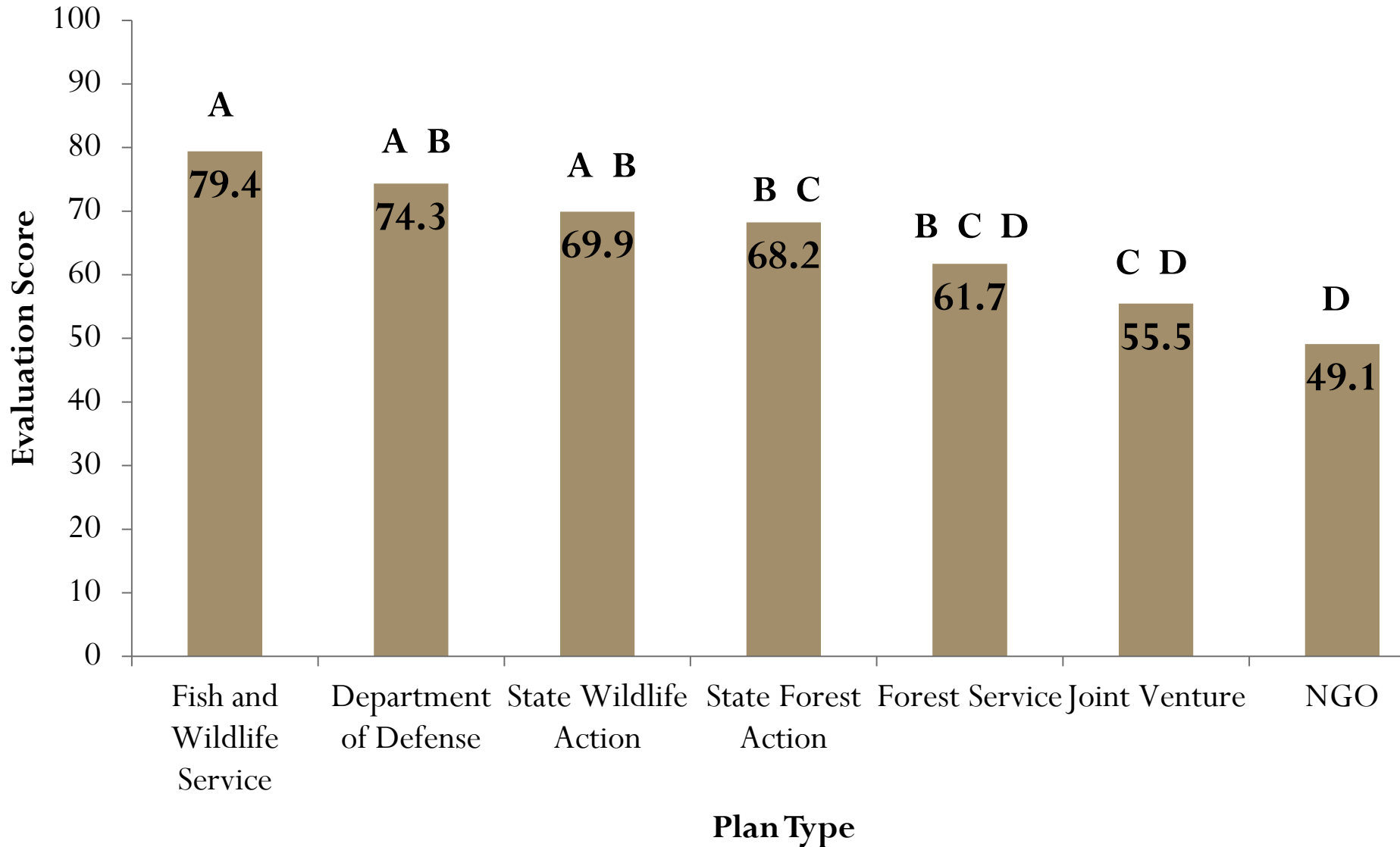
Regression Results

Planning Score	ß	P-value	R^2
Problem and objective statement	1.225	0.049	0.113
Fact base	1.997	0.002	0.257
Actions and implementation	-0.063	0.088	0.086
Integration with other plans	4.404	0.002	0.252
Stakeholder participation	4.378	0.004	0.225
Total	1.318	0.018	0.158

- Score =a+b(year)
- Lower scores associated with older plans

Discussion and Conclusions

Total Score Discussion

- Scores were higher for newer plans
  - Increase in planning requirements
  - Use of best practices
- Longleaf pine plans scored higher than plans in other studies
  - Stakeholder participation
  - Adaptive management
- Strong fact base, weaker actions
  - Use of science based decision making and readily available data
  - Desire to maintain implementation flexibility

Variation in Scores

- Agency mission and planning contexts
  - Federal and state agency plans are more process-oriented
  - NGO and JV plans are strategic, vision defining
  - Mandates
    - Provide financial and technical assistance for planning
    - Require common set of plan elements
  - Funding

Plan Evaluation Conclusions

- Tool was effective way to provide objective assessment of plans

- Agencies are getting better at planning to address challenges of longleaf pine restoration

- Poorly developed actions and implementation protocols may have negative implications for meeting goals

- Improvements are needed
  - Clearer definition of decision problem, objectives, actions
  - More frequent revisions

Future Work

- Link plan quality to success in achieving goals

- Identify factors influencing component scores

- Investigate how agencies use findings

- Tailor plans to capitalize on strengths of NR agencies and planners

Acknowledgements

Going Forward

- SECAS Conservation Decision Library – Summer 2015
  - Management plans and evaluation results
  - Interview transcripts and analysis report
  - Questionnaire
- Conservation Adaptation Planning for Landscapes and Climate Changes in the Southeast Project - 2015-2018
  - Summary of conservation goals and objectives in plans and strategic documents
  - Assessment of impacts of climate change on existing goals
  - Development of climate-aligned goals, strategies, and principles for managing change in the Southeast

QUESTIONS?